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Two loading related events involving a Boeing 737, VH-YIR and an Airbus A330, VH-XFE

Occurrence 1: Boeing 737, VH-YIR

What happened (Bali)

On 26 May 2014, a Boeing 737 aircraft, registered VH-YIR, operated by Virgin Australia, was being loaded at Bali International Airport for a flight to Melbourne, Victoria. The flight had been delayed due to a series of disruptions following the cancellation of the previous day's flight to Melbourne. A breakdown of the baggage belt at Bali airport exacerbated the difficulty in loading and reconciling passenger baggage. A scheduled closure of the runway and airport curfew created time pressure for the ground staff who were manually re-tagging bags on the airport apron for the departing flights.

After a delay of about 30 minutes, the loading supervisor advised the captain that they were working to reconcile the passenger baggage and that there were bags for an Adelaide flight scheduled to depart at about the same time, in amongst the bags for Melbourne. Due to the time restriction, the ground staff were unable to load all of the bags for the Melbourne flight before the aircraft had to be prepared for departure. The load controller assessed that a total of 93 bags had been loaded onto the aircraft and the flight documents were produced using that figure. The load controller then provided the load sheet to the loading supervisor.

As the aircraft communications addressing and reporting system (ACARS) printer on the aircraft was unserviceable, the loading supervisor handed two copies of the load sheet to the captain. The captain verified the load sheet, checked its validity, signed it and handed one copy back to the loading supervisor. The captain then used the load sheet data to calculate the trim and speed settings for take-off. The flight crew did not detect any abnormal aircraft handling or indications during the take-off or flight to Melbourne.

About 30 minutes after the aircraft departed Bali, the ground handler advised network operations and load control that the final baggage numbers were incorrect. The total number of bags loaded onto the aircraft was 189 instead of 93, with an estimated additional weight of about 1,600 kg. The load control team leader assessed that the additional baggage weight was acceptable for the flight, that adequate fuel had been uploaded to cater for the extra baggage weight, and elected not to advise the flight crew of the discrepancy.

At the time of the occurrence there was no formal procedure to advise flight crew of a loadsheet discrepancy detected during the flight. However, if the flight crew were advised of loadsheet discrepancy in-flight, it is envisaged that the additional weight figure would be used by flight crew to modify the approach speeds that had been generated based on the weight entered into the flight management computer prior to departure. For an extra weight of 1,600 kg, the captain reported that the approach speeds would normally increase by about 1-2 kt.

The ground staff in Melbourne were subsequently advised of the additional baggage, however during unloading no reconciliation was conducted to determine the exact number and location of the bags. It was later determined that, based on estimates, the aircraft remained within the weight and balance limitations throughout the flight and the additional weight would have had a negligible effect on the aircraft's take-off performance.

Occurrence 2: Airbus A330, VH-XFE

What happened (Perth)

On 15 June 2014, an Airbus A330 aircraft, registered VH-XFE, was being loaded for a Virgin Australia flight from Perth, Western Australia, to Brisbane, Queensland.

The load coordinator directed positioning of the ground service equipment at the rear hold only for the off-loading and loading of freight. He omitted to print and distribute the inbound load instruction (LI) sheet. The inbound load had been notated on the movement sheet[1] earlier that day, with no indication of any load arriving in the forward hold.

The load coordinator printed and distributed the outbound LI, on which no outbound items were allocated to the forward hold. The load coordinator then positioned the engineering stairs at the rear hold door. The forward hold was not opened or inspected at any time while the aircraft was on the apron at Perth Airport.

The deck loader operator then unloaded and loaded the rear hold in accordance with the instructions provided. The arrivals and departures checklist accurately indicated which tasks had been performed but not all of the items had been completed.

The aircraft loadsheet was then prepared and submitted to the captain. The flight departed at about 2245 Western Standard Time and landed in Brisbane without incident. The flight crew were not aware of any loading or weight and balance issues during the flight. During offloading, ground staff at Brisbane Airport found a crate of freight weighing 1,467 kg in the forward hold that had not been manifested and was supposed to have been offloaded in Perth prior to departure.

Safety action

Aircraft operator

As a result of these occurrences, Virgin Australia has advised the ATSB that they are taking the following safety actions:

Communication

An urgent memo (Hot Topic), was issued by the ground services provider to all A330 ports about checking aircraft holds and accurate completion of arrivals and departures checklists.

A Virgin Australia Safety Focus article – *Aircraft loading events* was released on 19 June 2014 and was required to be sighted and acknowledged by all staff.

A local memo was issued to all load supervisors at Bali International Airport to ensure reconciliation of baggage occurs for all flights.

Refresher training

Load Coordinator and Deck Loader Operator responsibilities specific to Perth operations were defined. Refresher sessions were to be held for staff holding those roles covering:

- Criticality of loading integrity and weight and balance.
- Processes and responsibilities as defined.
- Reinforcement and clarification of the safety importance of each role.
- Associated documentation and integrity of information including the use of load instruction and Arrivals and Departures checklist.

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[1] Movement sheets are produced to display a summary of flight information including scheduled and estimated arrival and departure times, flight numbers and bay allocations, as a guide to all staff.

Inspections

Daily inspections of loading and unloading the A330 aircraft were to be conducted.

Port review

An extensive port review of Bali International Airport was conducted to identify key risks and causes of loading errors and development of an action plan to mitigate those risks.

Weight discrepancy procedures

An interim procedure has been implemented to advise flight crew of any weight discrepancy ground staff are alerted to. Formal policies are being developed to advise flight crew of weight discrepancies and the subsequent appropriate actions to be taken.

Safety message

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is about data input errors, www.atsb.gov.au/safetywatch/data-input-errors.aspx. Data input errors, such as the incorrect loading figures being used, occur for many different reasons. The consequences of these errors can include a range of aircraft handling and performance issues.

Accurate weight and balance information is essential for the safety of every flight. These incidents demonstrate the impact distractions such as time pressure and equipment malfunction can have on the accuracy of that information. Following standard procedures and checklists minimise the potential for error.

General details

Occurrence details – occurrence 1

Date and time:	25 May 2014 – 1831 UTC	
Occurrence category:	Incident	
Primary occurrence type:	Loading related event	
Location:	Bali International Airport, Indonesia	
	Latitude: 08° 44.88' S	Longitude: 115° 10.05' E

Aircraft details: VH-YIR

Manufacturer and model:	The Boeing Company 737-8FE	
Registration:	VH-YIR	
Operator:	Virgin Australia	
Serial number:	39925	
Type of operation:	Air transport high capacity	
Persons on board:	Crew – 6	Passengers – 161
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Occurrence details – occurrence 2

Date and time:	16 June 2014 – 2130 WST	
Occurrence category:	Incident	
Primary occurrence type:	Loading related event	
Location:	Perth Airport, Western Australia	
	Latitude: 31° 56.42' S	Longitude: 115° 58.02' E

Aircraft details: VH-XFE

Manufacturer and model:	Airbus A330-243	
Registration:	VH-XFE	
Operator:	Virgin Australia	
Serial number:	1319	
Type of operation:	Air transport high capacity	
Persons on board:	Crew – 10	Passengers – 143
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

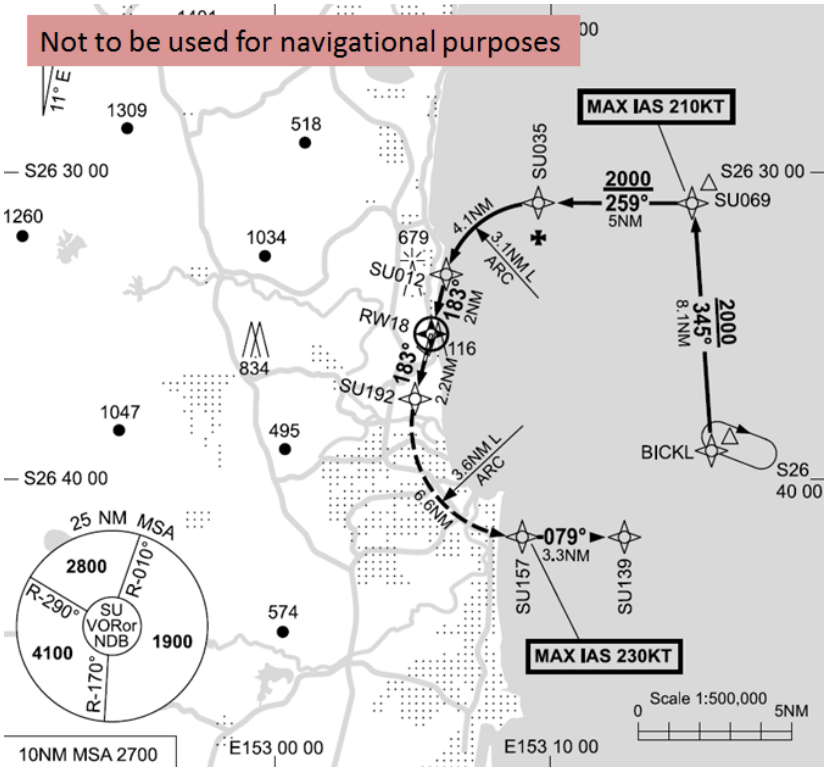
Separation issue involving a Bell 206, VH-XJA, and an Airbus A320, VH-VGJ

What happened

On 3 July 2014, at about 1930 Eastern Standard Time (EST), an instructor and student pilot of a Bell 206 helicopter, registered VH-XJA (XJA), departed Sunshine Coast Airport on a planned flight to Gympie, Queensland. At about 1940, due to low cloud in the area, the instructor elected to return to Sunshine Coast to conduct night circuits and selected the transponder to ALT with the code of 1200[1]. Also at about 1940, the air traffic control (ATC) tower at Sunshine Coast Airport closed in accordance with its published hours of operation.

A Jetstar Airbus A320 aircraft, registered VH-VGJ (VGJ), was inbound from Melbourne, Victoria to Sunshine Coast Airport via the area navigation (RNAV) required navigation performance approach to runway 18 (Figure 1). When about 30 NM from the Sunshine Coast, the first officer, as pilot monitoring (PM),[2] broadcast on the common traffic advisory frequency (CTAF), that they were inbound with an estimated arrival time of 2002 EST. The first officer did not receive any response to the broadcast, and reported that the CTAF was quite busy with a lot of radio broadcasts from other aircraft in the vicinity.

Figure 1: Extract from RNAV-X RWY 18 approach, Sunshine Coast



Source: Airservices Australia

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1 1200 is the standard transponder code used for VFR flights outside controlled airspace.

2 Pilot Flying (PF) and Pilot Monitoring (PM) are procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and aircraft flightpath.

Figure 2: VH-VGJ track via the RNAV-X RWY 18 approach

Source: Operator

When approaching waypoint BICKL (Figure 2) and passing about 4,500 ft on descent, VGJ was cleared by Brisbane Centre ATC to leave controlled airspace and advised that there was no relevant instrument flight rules (IFR) traffic. The crew observed some visual flight rules (VFR) aircraft on the traffic collision avoidance system (TCAS)[3]. Another Jetstar A320 aircraft then broadcast on the Brisbane Centre frequency that they were taxiing at Sunshine Coast Airport and ATC confirmed that the first officer of VGJ had copied that call.

When 10 NM from the runway, approaching SU069 on the RNAV approach, the first officer broadcast on the CTAF that VGJ had left 3,800 ft and was conducting an instrument approach to runway 18, expecting to land at time 2001, but did not include the distance from the runway in the broadcast. He did not receive any reply. The instructor of XJA heard the call from VGJ and, as no distance was given in the broadcast, assumed that the aircraft was then about 15 NM away. He also expected that the crew of VGJ would subsequently broadcast when 10 NM and 5 NM from the runway, and he elected to continue the circuit and monitor the CTAF for those calls.

There were numerous helicopters operating in the area making broadcasts on the CTAF and the first officer of VGJ noted their call-signs and attempted to build a mental picture of where they were located. The other A320 aircraft had entered the runway and was backtracking. The helicopter XJA was then on downwind and the instructor sighted the aircraft taxiing and broadcast that he would extend the downwind leg to remain clear of the aircraft on the runway. The flight crew of the departing aircraft and the first officer of VGJ both broadcast a response acknowledging the pilot of XJA. At that stage, the first officer of VGJ assumed they would not come into conflict with XJA.

When approaching the waypoint SU069, the captain of VGJ became concerned that they had not received any response to their broadcasts and directed the first officer to communicate to the helicopter pilots in the area to determine their location and intentions.

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[3] Traffic collision avoidance system (TCAS) is an aircraft collision avoidance system. It monitors the airspace around an aircraft for other aircraft equipped with a corresponding active transponder and gives warning of possible collision risks.

As VGJ passed waypoint SU035 turning onto final approach, the aircraft, which had been in and out of cloud, became clear of cloud at about 2,500 ft. The captain was concerned about the position of helicopters operating in the area and made a direct call to one helicopter pilot requesting their current position and intention. That helicopter reported operating and remaining in ground effect and not near the runway. The first officer then observed that VGJ was about 400 ft above the normal approach profile and alerted the captain. The captain corrected the flight path.

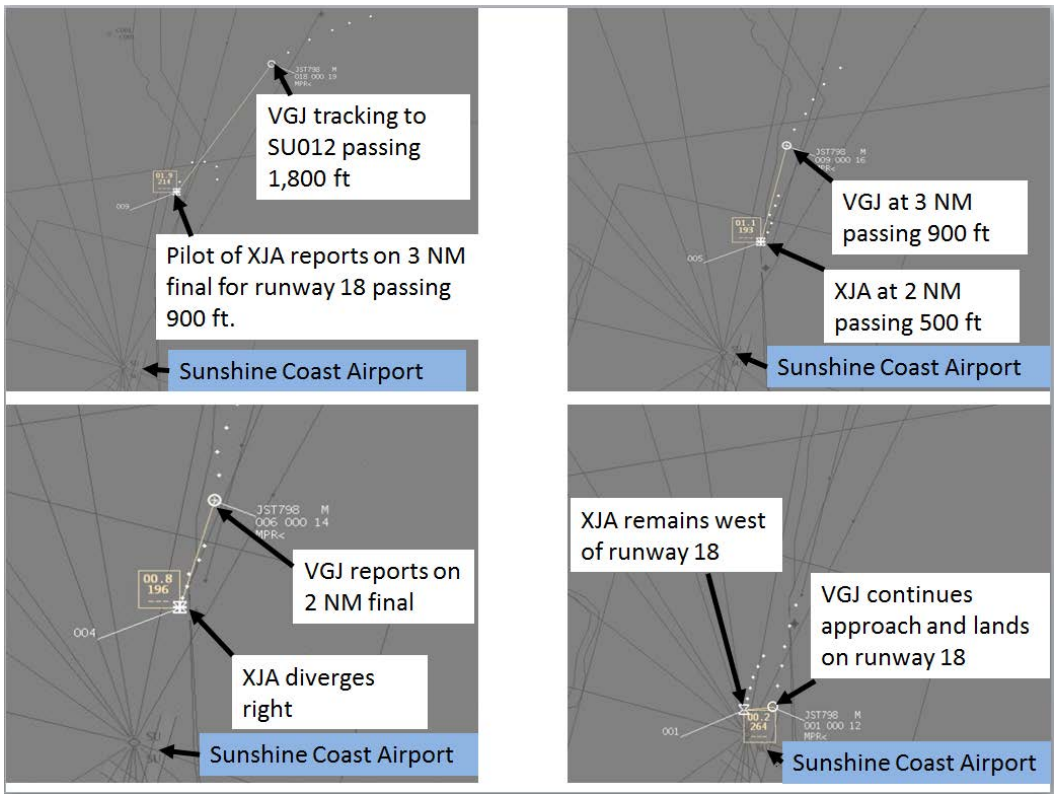
When on a 3 NM final approach, the instructor of XJA broadcast a 3 NM final call, but neither the captain nor the first officer of VGJ reported hearing this call. About 10 seconds later, the crew of the A320 on the runway broadcast rolling on runway 18. About 1 minute after that call, when established on the runway centreline, the first officer of VGJ broadcast stating that they were on a 2 NM final. Hearing this call, the instructor of XJA turned and sighted the landing lights of VGJ close behind, took control of the helicopter from the student, diverged to the right and commenced a climb. He estimated that the aircraft passed about 300 m away.

The crew of VGJ did not receive a TCAS traffic alert (TA)[4] or resolution advisory (RA)[5] or any indication of a loss of separation with another aircraft.[6] The aircraft subsequently landed normally.

Data Review

Radar data provided to the ATSB by Airservices Australia indicated that the two aircraft passed at an altitude of about 200-300 ft with a lateral separation of about 370 m (Figure 3).

Figure 3: Radar data showing relative positions of VH-VGJ and VH-XJA



Source: Airservices Australia

[4] Traffic Collision Avoidance System Traffic Advisory, when a TA is issued, pilots are instructed to initiate a visual search for the traffic causing the TA.

[5] Traffic Collision Avoidance System Resolution Advisory, when an RA is issued pilots are expected to respond immediately to the RA unless doing so would jeopardize the safe operation of the flight.

[6] TCAS RAs were inhibited below 900 ft AGL, all aural alerts were inhibited below 400 ft and when VGJ was below 1,700 ft, all 'intruders' below 380 ft were inhibited.

Safety action

Operator of VH-VGJ

As a result of this occurrence, Jetstar has advised the ATSB that it is taking the following safety actions:

Communication

A 'red' flight standing order (RED FSO)[7] was issued to remind all flight crew of the importance of vigilance when operating at non-controlled aerodromes. The FSO advised flight crew to review the standard procedures and maintain a high level of awareness of other traffic using all possible means. Pilots were reminded to be aware of the inhibition logic of TCAS during approach to land.

Risk analysis and policy review

A risk assessment was conducted on CTAF operations. Scheduling policy and procedures were to be developed to include consideration of controlled versus non-controlled airspace.

Tower hours extension procedures

Criteria for requests of extension to tower hours as well as a formal procedure for submitting the requests are to be developed.

Training

CTAF traffic scenarios are to be included in cyclic training checks for flight crew.

Operator of VH-XJA

The operator of XJA has advised their company pilots when communicating with other aircraft, to reply using their callsign, and to state their location and intentions. This is to assist pilots of other aircraft develop a mental picture of aircraft traffic and identify potential conflicts. The incident was the subject of a safety training day, which provided a learning opportunity for company pilots and students.

Safety message

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is safety around non-controlled aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

Research conducted by the ATSB found between 2003 and 2008, 181 occurrences of reduced separation reported, of which 55 were near mid-air collisions. Insufficient communication between pilots and breakdowns in situational awareness were the most common contributors to safety incidents in the vicinity of non-controlled aerodromes.

A review by the ATSB of mid-air collisions between 1961 and 2003 also found that almost 80 per cent of mid-air collisions (29 accidents) occurred in or near the circuit area. *A pilot's guide to staying safety in the vicinity of non-towered aerodromes* is available at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx.

This incident highlights the importance of using both unalerted and alerted see-and-avoid principles and maintaining a vigilant lookout at all times.

[7] RED FSOs are published to indicate that non-compliance with the procedures may have significant impact on the operation of the aircraft.

General details

Occurrence details

Date and time:	3 July 2014 – 1959 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Separation issue	
Location:	Sunshine Coast Airport, Queensland	
	Latitude: 26° 36.20' S	Longitude: 153° 05.47' E

Aircraft details

Manufacturer and model:	Airbus A320-232	
Registration:	VH-VGJ	
Operator:	Jetstar Airways	
Serial number:	4460	
Type of operation:	Air transport high capacity – passenger	
Persons on board:	Crew – 6	Passengers – Unknown
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Helicopter details

Manufacturer and model:	Bell Helicopter Company 206B	
Registration:	VH-XJA	
Serial number:	3744	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Turboprop aircraft

A flight navigation instrument event, involving a Beech 1900D, VH-YOA

What happened

Beech 1900D: VH-YOA

Source: Operator

On 19 March 2014, a flight test for the issue of a Civil Aviation Safety Authority (CASA) Approved Test Officer (ATO) delegation[1] was being conducted by two officers from the Civil Aviation Safety Authority (CASA), on the senior check and training captain for the organisation.

The test involved an Instrument Flight Rules (IFR) procedures flight in a Beech 1900D aircraft (1900D) registered VH-YOA (YOA). The captain under test occupied the left seat of the aircraft. He was being observed by the CASA officers, as he conducted an instrument rating test on a newly employed first officer (FO) occupying the right seat. The two officers from CASA were seated directly behind the flight crew.

The first sector of the flight was from Adelaide to Kingscote Airport, Kangaroo Island, South Australia. On arrival at Kingscote, the FO, as the pilot flying, conducted the RNAV-Z RWY19 approach, and then a single engine[2] missed approach. The flight continued beyond Kingscote, with approaches conducted at other airports prior to returning to Adelaide. The weather conditions were good, allowing the entire flight to be conducted in visual meteorological conditions (VMC).

During the test de-briefing, the CASA officers queried why the flight director (FD) bars on the Rockwell Collins electronic attitude director indicator (EADI) (Figure 1), which the FO was following, were not agreeing with the information presented by the Bendix King KLN90B Global Positioning System (GPS) (Figure 2). The course direction indicator (CDI)[3] linked to the GPS, was about half scale deflection out, when the flight director bars were followed. A disconnect between the information given by the FD bars, and that given by the GPS, occurred when the GPS re-scaled[4] in the latter part of the approach. As the majority of the company flight crew reported not engaging the flight director bars when conducting an RNAV approach, the issue had not been previously identified.

To further test the interaction occurring between the GPS and the flight directors, the chief pilot and first officer conducted a test flight using YOA. The test flight departed Adelaide on 26 March 2014, conducting the RNAV approach into Coober Pedy, and two RNAV approaches into Whyalla.

During the first RNAV approach into Whyalla, the crew used a combination of NAV and/or APPROACH modes and noted that, when selected, neither the captain's nor first officer's flight director bars displayed accurate information. This was confirmed during the next RNAV approach to runway 04 at Coober Pedy. During a subsequent RNAV approach for Whyalla, the flight director was not selected, and the indications displayed during the RNAV approach using the KLN90B GPS were normal.

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1 An ATO delegation allows the holder to conduct flight tests and issue licences and ratings (depending on the delegation),such as instrument ratings, to candidates meeting all CASA pre-requisites and deemed at a competent standard

2 This is a typical test condition, simulating a failed engine at or near the minima. The pilot flying has to re-configure the aircraft in a timely and safe manner, to conduct a climb on one engine to the minimum safe altitude.

3 The Course Directional Indicator is an avionics instrument used to determine an aircraft's lateral position in relation to a course (Wikipedia)

4 The scale factor changes from +- 1.0NM to +_ 0.3 NM

Figure 1: Rockwell Collins Electronic Attitude Director Indicator (EADI)

Source: University College London

The operator sought clarification from the aircraft flight manual supplements to determine why the discrepancy occurred when the FD's were selected. However the flight manual did not give a clear instruction regarding the use of FD's during an RNAV approach. Other operators utilising the same aircraft type also found a similar lack of information from the flight manual supplements.

Figure 2: A Bendix / King KLN 90B GPS

Source: Aircraft Spruce and Speciality Company

In the interests of safety, and to be able to give a firm directive to company pilots, the company conducted a similar test flight in their other Beech 1900D aircraft, VH-ZOA (ZOA).

In VMC, they experimented with the selection of different approach modes with the FD's selected, then not selected. Initially they used the NAV only mode, then NAV and APPROACH FD modes. During the RNAV approach into Whyalla, the GPS CDI agreed with the flight director information, however during the RNAV approach into Coober Pedy, the captain's flight director worked correctly, but the first officer's flight director gave erroneous information.

In summary, during several RNAV approaches into a range of different airports, in both of the 1900D aircraft, erroneous information was presented to the flight crew when the FD bars were selected. The crew reported that sometimes the error was from the captain's flight director, and sometimes from the first officer's. The only consistency was that the fault occurred when the GPS

was re-scaling during the latter part of the approach. It was determined that there was no error with the KLN90B GPS.

Both the captain's and first officer's flight directors were reported as providing accurate guidance during instrument landing system (ILS), and VHF omnidirectional range (VOR) approaches, and during long range navigation (LNR).

Aircraft

The Beech 1900D is a pressurised 19 seat twin turbo-prop aircraft.

Both YOA and ZOA had a Rockwell Collins electronic flight information system (EFIS-84) fitted. The primary display of the EFIS consists of multicolour cathode ray tube (CRT) displays, which provide both conventional electronic attitude direction indicator (EADI), and electronic horizontal situation indicator (EHSI) functions. Flight directors can be selected for both the captain and first officer's EADI. The operator updates the navigation database in each aircraft every 28 days.

Engineering / Avionics report

The organisation obtained an independent avionics engineering check on the GPS installation for both YOA and ZOA. Both aircraft had the KLN90B wiring continuity tested. It was reported that the wiring and interfaces were in accordance with an approved foreign Supplemental Type Certificate (STC).

CASA comment

With the permission of the operator, CASA were contacted to provide assistance. They were able to rule out maintenance issues, but determined that there were differences between the original equipment manufacturer recommendations and the diagrams of the installation as supplied by the operator.

ATSB comment

A search was conducted of the ATSB database, but no similar occurrences had been reported. Similarly, when contacted, CASA had no similar incidents reported to them through the service difficulty reporting (SDR) system.

The ATSB contacted current Australian operators of the 1900D aircraft type and there were no similar errors reported as for YOA and ZOA.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following safety action in response to this occurrence.

Operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they have submitted a Service Difficulty Report to CASA and are taking the following safety actions:

Flight Crew Directive from the Chief Pilot:

> *All crew members B1900 / B200*
>
> *We have noticed that if the Flight Director is coupled to RNAV approaches, there is a possibility that the Flight Director data in incorrect.*
>
> *Company procedures have been amended to preclude the use of RNAV approaches with the FD selected.*
>
> *They are only to be used on long range navigation (LRN), instrument landing system (ILS) and VOR approaches.*

ATSB

The ATSB was unable to reconcile the differences between the equipment manufacturer's original wiring recommendations and those for the foreign STC modifications on these aircraft. Both YOA and ZOA were compliant with the wiring installation as provided, but this wiring differs from that recommended by the manufacturer. In light of this, the ATSB is forwarding a copy of this report to the foreign Civil Aviation Authority responsible for the authorisation of the equipment installation instructions for further investigation.

General details

Occurrence details

Date and time:	19 March 2014 – 0830 CST	
Occurrence category:	Incident	
Primary occurrence type:	Technical Systems – Avionics / Flight Instruments	
Location:	13 km North of Kingscote Airport, South Australia	
	Latitude: 35° 35.88' S	Longitude: 137° 32.45' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corporation 1900D	
Registration:	VH-YOA	
Serial number:	UE-143	
Type of operation:	Charter	
Persons on board:	Crew – 2	Passengers – 2
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Trim system malfunction involving a Fairchild SA227, VH-UZI

What happened

On 6 August 2014, at about 0500 Eastern Standard Time (EST), the pilot of a Fairchild SA227 aircraft, registered VH-UZI, conducted a pre-flight inspection and weight and balance calculations for a freight charter flight from Rockhampton to Townsville, Queensland. The freight was loaded with a forward centre of gravity, but well within the allowable envelope. The pilot set the trim in the cockpit at a nose-up trim position.

During the take-off run, the pilot reported all indications and performance were normal passing 70 knots. Passing V_1,[1] as the pilot increased the back pressure on the control yoke to rotate the aircraft for take-off, the control column felt heavy and the aircraft nose wheel did not lift off the ground. The pilot continued to increase the back trim and back pressure on the control yoke and the 'out of trim' warning sounded. The pilot rejected the take-off, applied maximum braking and reverse thrust. The aircraft decelerated to a slow taxi speed with about 600 m of runway remaining.

After taxiing the aircraft back to the bay, the pilot requested the freight be re-weighed. The pilot then recalculated the aircraft weight and balance with the actual freight distribution and found the centre of gravity slightly more forward than the original load sheet position.

The pilot set the stabiliser trim gauge in the cockpit to read a nose up attitude, and then externally inspected the position of the stabiliser. He observed the stabiliser in a neutral position and therefore determined that the gauge did not accurately indicate the stabiliser position (Figure 1). The pilot assessed that the combination of the incorrectly loaded freight causing a forward centre of gravity and the inaccurate stabiliser trim gauge led to the out of trim warning and overly heavy control pressure required for the attempted take-off.

Figure 1: Cockpit indication with horizontal stabiliser in the neutral (take-off) position

Source: Operator

[1] V1 is the critical engine failure speed or decision speed. Engine failure below this speed shall result in a rejected take-off; above this speed the take-off run should be continued.

Engineering inspection

An engineering inspection found that the actual position of the horizontal stabiliser was not being correctly displayed on the pitch trim indicator in the cockpit. The engineer then calibrated the system and returned the aircraft to service. During a fleet-wide check the following day, it was found that the pitch trim system on UZI was not being consistently displayed with accuracy on the cockpit indicator. The potentiometer in UZI was replaced which resolved the fault.

Freight reconciliation

Overall, the actual freight loaded weighed about 30 kg more than that stated on the load plan. One of the aircraft's freight 'zones' was loaded with 72 kg more than the placard maximum weight for that zone. A revised trim sheet was prepared using the re-weigh information and found that the aircraft was within the centre of gravity limits for the proposed flight with a centre of gravity slightly forward of the original calculated position.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Aircraft operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they are taking the following safety actions:

Survival aspects

- Investigate the length of the runway used and the possibility of a runway overrun on a shorter runway.

Ground handling management

- Investigate the management of the ground handler and the manner in which the aircraft are loaded at all ports.

System calibration

- Review the system calibration used in the initial engineering inspection.

Safety message

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is about data input errors, www.atsb.gov.au/safetywatch/data-input-errors.aspx. Data input errors, such as the incorrect loading figures being used, occur for many different reasons. The consequences of these errors can include a range of aircraft handling and performance issues.

This incident also demonstrates that by electing to use the full runway length, following standard procedures and acting immediately on receiving a warning, the pilot ensured there was sufficient distance to safely reject the take-off.

General details

Occurrence details

Date and time:	6 August 2014 – 0500 EST	
Occurrence category:	Incident	
Primary occurrence type:	Technical – Systems – Flight controls	
Location:	Rockhampton Airport, Queensland	
	Latitude: 23° 22.92' S	Longitude: 150° 28.52' E

Aircraft details

Manufacturer and model:	Fairchild Industries SA227-AT	
Registration:	VH-UZI	
Serial number:	AT-570	
Type of operation:	Freight charter	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Piston aircraft

Runway excursion involving a Cirrus SR22, VH-SRI

What happened

On 30 March 2014, a Cirrus SR22, registered VH-SRI, was being operated to conduct a private flight from Tyabb to Great Lakes Airfield, Victoria, with the pilot and one passenger on board. The flight was conducted in visual meteorological conditions.

During the cruise, the pilot assessed the wind at the airfield to be from the north-west and elected to land on runway 31, a shorter gravel runway, instead of the sealed longer runway 26 as initially planned.

The pilot reported that the approach and landing was normal. The aircraft touched down on the runway at the first white gable marker (Figure 1) at about 1320 Eastern Daylight-saving Time. As the aircraft passed the intersection with runway 26/08, the pilot realised that the aircraft was not slowing quick enough to stop in the remaining runway available and so applied the brakes harder. The aircraft departed the end of the runway, went through the airport boundary fence and came to rest on a road. The pilot turned off the fuel and all switches and exited the aircraft with the passenger. The pilot and passenger were uninjured and the aircraft was substantially damaged (Figure 2).

Figure 1: Great Lakes Airfield

Source: Google earth

Figure 2: Accident site

Source: Victoria Police

Pilot comment

The pilot reported that his pre-flight planning revolved around overflying the airport for a landing on the longer sealed runway 26 using the Cirrus performance data to calculate the landing distance for a dry, level, paved runway. During the flight, the pilot determined that the wind was coming from the north-west and decided that runway 31 was more suitable to land on. The pilot reported that he did not overfly the airfield or observe the wind sock prior to landing which was his normal practice.

About 15 minutes after the landing, the pilot observed the wind sock from the location of the accident site and thought that it was showing the wind coming along the runway, in the direction of the landing, at about 10 knots.

The pilot reported that after the accident, he went over the performance calculations with a flying instructor and they had calculated that runway 31 had an adequate landing distance but there was not a great margin if any of the random variables were different, like touch down point, airspeed and wind direction.

The pilot re-checked the meteorological data after the accident and saw that the wind was predicted to be from the north-west at 0900 and at 1500 was to be from the south-east. The pilot thought that he may have landed as the wind was changing direction and that a tail wind component may have existed at the time of landing.

The pilot reported that in the future he would review all the runways at the destination airport and overfly the airport to confirm the runway lengths and wind sock/s.

Safety message

The accident highlights the importance of thorough pre-flight planning to minimise safety critical decisions in flight, maintaining situational awareness, applying an appropriate safety margin to the landing distance including obstacle clearance and climb if a go around is required, confirming the runway length and wind direction prior to landing.

The ATSB report AR-2008-045, *Improving the odds: Trends in fatal and non-fatal accidents in private flying operations* encourages pilots to make decisions before the flight, continually assess the flight conditions (particularly weather conditions), evaluate the effectiveness of their plans, set personal minimums, assess their fitness to fly, set passenger expectations by making safety the primary goal, and to seek local knowledge of the route and destination as part of their pre-flight planning. The report is available at www.atsb.gov.au/publications/2008/ar2008045.aspx.

CASA has published several tools to assist pilots to learn more about human factors involving situational awareness, decision making and weather. Some of them include:

- CASA has developed the *Look out! Situational awareness* DVD for pilots to learn more about the safety-critical skills that makes up situational awareness. There is strong emphasis on the need to prepare and plan for every flight – not just for hours but for days and sometimes weeks, 'you can never be too prepared' and covers the techniques required for maintaining situational awareness. The DVD gives a definition of situational awareness as "what's happened, what's happening and what might happen".
- The CASA training resource *Safety Behaviours: Human Factors for Pilots* has been specifically designed for the General Aviation and Low Capacity Regular Public Transport sectors. The package contains a comprehensive resource guide that enables pilots to develop their knowledge in the areas of fatigue management, stress management, alcohol and other drugs, communication, teamwork, leadership, situational awareness, decision making, threat and error management and airmanship.
- The CASA *Weather to Fly* DVD provides educational material on weather related assessment and decision making. Tips are given on flying in and around bad weather and has advice from chief flying instructors from local aero clubs on some of the critical areas.

The CASA educational publications are available through the CASA online store.

The CASA Draft Advisory Circular 91-225(0) – *Safety during take-off and landing for small aeroplanes* discusses applying a safety factor to the performance calculations for landing distance as the certification process allows the manufacturer to determine the take-off and landing performance under ideal conditions. Transport Canada also discusses this in their power point presentation on *Flying: Risk Factors and Decision Making* available at www.tc.gc.ca/eng/civilaviation/publications/tp14112-risk-decision-ppt-6135.htm#s1.

General details

Occurrence details

Date and time:	30 March 2014 – 1320 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Runway excursion	
Location:	Great Lakes Airfield, Victoria	
	Latitude: 37° 50.55 'S	Longitude: 148° 00.02' E

Aircraft details

Manufacturer and model:	Cirrus Design Corporation SR22	
Registration:	VH-SRI	
Serial number:	0631	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 0	Passengers – 0
Damage:	Substantial	

Hard landing, involving a PA28RT, Piper Arrow, VH-ADU

What happened

A PA28RT Piper Arrow aircraft

Source: Airliners.net: Darren Wilson

On 17 June, 2014 a PA28RT-201 Piper Arrow aircraft, registered VH-ADU (ADU), was returning to Mangalore Airport, Victoria for the final leg of a dual navigation exercise. The aircraft was being flown by a student pilot, monitored by an instructor. A second student pilot was observing from the back seat.

The aircraft had departed Mangalore about three hours earlier, and had overflown both Tocumwal and Finley (New South Wales) airports. The training flight had included several practice diversions, some low level navigation and also lost procedures training.

As the cloud base was still quite low in the area, the flight was unable to continue as planned into Albury, New South Wales, and instead, diverted directly back to Mangalore. The weather at Mangalore was fine with a light southerly wind.

As the aircraft approached Mangalore, the instructor asked the student to conduct a straight-in approach onto runway 18. The instructor had previously demonstrated this procedure, but this was the student's first attempt at flying this type of approach himself.

At about 1,500 ft above ground level, the student extended the landing gear, and at about 1,000 ft, selected the second stage of flap. The airspeed at this stage was about 80 knots. The student reported that the elevator felt heavy; but due to the stress he was experiencing, did not realise that the aircraft was incorrectly trimmed in a nose-down position. The instructor asked the student to confirm that the trim was correctly set, and he was advised that it was. The last stage of flap was selected on short final.

Some mechanical turbulence from a line of trees under the approach (Figure 1) caused the wings to roll, however the student was satisfied that the approach was still on profile.

As the student reduced power and commenced the flare[1], he reported using too much back pressure on the control column, resulting in the aircraft ballooning about 10 ft above the runway. The instructor called "taking over" but had not gained full control of the aircraft before the student relinquished his control, resulting in the aircraft rapidly dropping its nose.

The instructor reported needing to exert a great deal of force when attempting to return the nose to the landing position. He felt that although the aircraft had lost some airspeed during the balloon, that if assisted by a small amount of power, it still had sufficient speed to safely land. Just as he had pulled the nose back to almost level, the stall warning sounded, and the aircraft landed heavily on all three wheels.

Immediately after the heavy landing, with about 70 knots of airspeed remaining, the aircraft bounced, and the instructor initiated a go-around. When the aircraft was stable, he handed control back to the student, who flew most of the circuit. The student was apprehensive about another landing and during the flare, the aircraft ballooned again. The instructor took over control and completed a full stop landing on runway 18.

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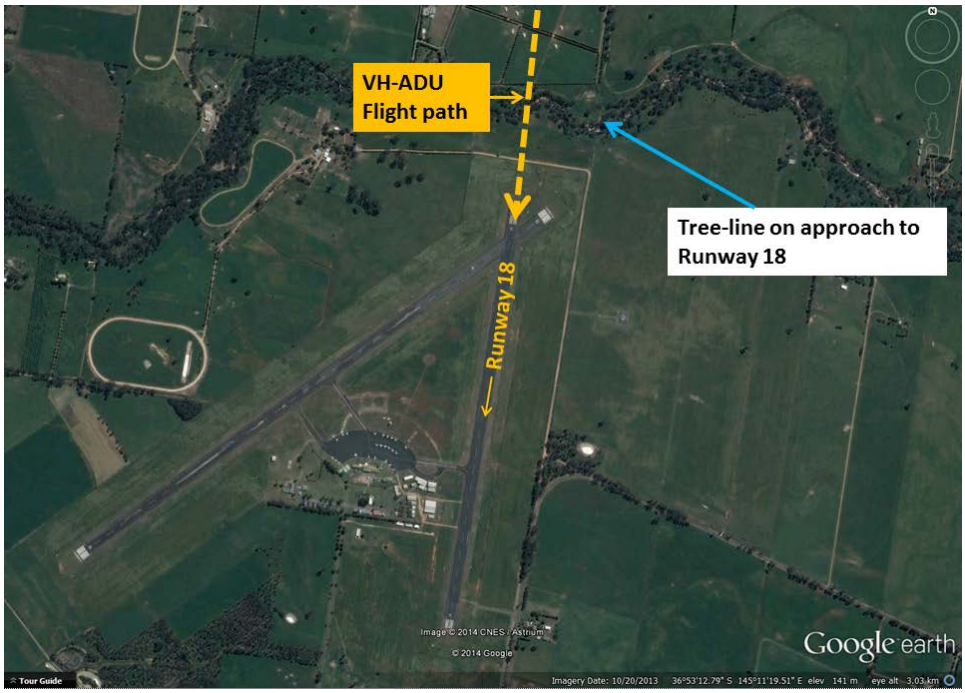
1 Final nose-up pitch of landing aeroplane to reduce rate of descent to approximately zero at touchdown

Figure 1: Mangalore Airport Runway 18



Source: Google earth

Neither the crew nor passenger was injured; however the aircraft sustained damage to the wing near the wing root, the engine mounts and the nose wheel assembly.

Instructor comments

The instructor held a Grade 2 Instructor Rating (A), having accrued over 1,080 instructing hours.

He commented that had the aircraft nose been in a better position when he took control during the first balloon, he would have initiated a go-around. He did not rate the occurrence landing as particularly heavy, but felt to err on the side of safety; the aircraft should be inspected by an engineer.

He reported that the elevator controls still felt very heavy during the second landing, and that power was required to assist during this phase. He commented that ADU is heavier than the other two T-Tail Arrows on the flight line.

Student comments

The student had about 148 hours total flying time, with about 13 hours on the Piper Arrow aircraft. This was the first time he had flown ADU and reported it as being a lot heavier in the elevator than the others Piper Arrows he had flown.

He also reported that he was feeling some degree of stress, as the navigation exercise had been intense, with a high workload, and low cloud. He felt that due to the tension in his arms, he had not realised the aircraft was incorrectly trimmed until he had removed his hands from the control column, and the nose dropped.

He suggested that an instructor should have full control of the aircraft before giving the 'taking over' command so that at least one person had full control of the aircraft at all times.

Operator comments

The operator report noted some discrepancies between the instructor and student pilot recollection of events. However they both reported that the elevator on that day was particularly

heavy. Two other instructors at the flying school had reported ADU as being notably heavier in the elevator than the other Piper Arrows on the line.

The operator noted that in the past 12 months, there had been no entries placed in the aircraft maintenance release, or reports via the company's internal maintenance notification form.

The report also noted the instructor reported a restriction in aft movement of ADU's control column on that day, and with the nose pointing down, the instructor was unable to apply power.

The anti-servo tab, which serves to make the controls feel heavier and increase stability, was inspected and found to be serviceable.

Independent Engineering report

A subsequent independent engineering report was conducted. The aircraft was inspected in accordance with the PA28RT-201 service manual. All components of the elevator and trim systems were found serviceable and within limits.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Flying school

As a result of this occurrence, the flying school management has advised the ATSB that they are taking the following safety actions:

Reinforcement of procedures to operational personnel

Operational management will reinforce the correct handover / takeover procedure to all flying staff.

Maintenance reporting

A briefing will be given to all staff regarding aircraft unserviceability reporting procedures.

Safety message

On this occasion there was a short delay between the instructor issuing the command 'taking over", and being in a position to be able to fully take command. The student's response in relinquishing control was swift, giving the incorrectly trimmed aircraft an opportunity to be in a nose down position close to the ground.

The United States Department of Transportation, Federal Aviation Administration *Aviation Instructor's Handbook 2008 (*p 8-9) devotes a section to the Positive Exchange of Flight Controls.

This publication states that numerous accidents have occurred due to a lack of communication or misunderstanding regarding who had actual control of the aircraft, particularly between students and flight instructors. It continues on to say during flight training, there must always be a clear understanding between students and flight instructors about who has control of the aircraft. It promotes a positive three steep process for the exchange of flight controls including a visual check to see that the other person actually has the flight controls. Flight instructors should always guard the controls, and be prepared, as pilot in command, to take control of the aircraft.

Further reading is available at:

www.faa.gov/regulations_policies/handbooks_manuals/aviation/aviation_instructors_handbook/media/faa-h-8083-9a.pdf

The Civil Aviation Safety Authority (CASA) *Flight Instructor Manual (2) (2007)– Aeroplane,* directs instructors to repeatedly practice the "handing over and taking over" drills, in the early air sequences, to prevent any confusion on who is manipulating the controls.

The CASA *Flight Instructor Manual* is available at:

www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_90300

General details

Occurrence details

Date and time:	17 June 2014 – 1300 EST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Mangalore Airport, Victoria	
	Latitude: 36° 53.30’ S	Longitude: 145° 11.05’ E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA 28RT-201	
Registration:	VH-ADU	
Serial number:	28R-8018063	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Wheels-up landing involving a Cessna 210, VH-SKQ

What happened

On 9 July 2014, the pilot of a Cessna 210 aircraft, registered VH-SKQ, conducted a scenic charter flight from Broome, Western Australia, to Windjana Gorge, Silent Grove, Mt Hart Station, Cape Leveque and return to Broome, with five passengers on board.

When approaching Broome Airport, the aircraft was cleared by air traffic control (ATC) via a coastal route at 1,000 ft above mean sea level. At about 1716 Western Standard Time (WST), the pilot was cleared for, and turned the aircraft onto, a left base leg for runway 10. Due to another aircraft backtracking on the runway, the pilot was directed by ATC to extend the base leg. The pilot then selected 10º of flap and the landing gear lever to the extended position, and reported that he had observed the green light indicating the landing gear was extended.

When on the final leg of the approach, the pilot was issued a landing clearance later than usual due to the aircraft ahead. He reported that he performed the final checks, however omitted to look outside and visually confirm by sighting the left main landing gear, whether the gear was in the extended position. The pilot flared the aircraft for landing, aiming to touch down about 100 m beyond the threshold. He realised that the aircraft was lower to the ground than normal on touchdown, and heard what he believed were the main tyres contacting the runway, followed by the aircraft belly and propeller. The aircraft sustained substantial damage.

A witness observed the aircraft on the base leg, with the nose landing gear extended and the main landing gear retracted (Figure 1).

Figure 1: Aircraft on base leg

Source: David Sorrell-Saunders

Engineering inspection

An engineering inspection found that a faulty nose gear up lock switch resulted in the nose gear extending during flight. This resulted in the main landing gear failing to extend.

Safety message

While the cause of the main landing gear failure to extend has not been determined, the pilot was unaware that it had not extended prior to landing as the visual check was omitted.

This incident highlights the impact a combination of distraction can have on aircraft operations, particularly during a critical phase of flight.

While experience and familiarity with operations are invaluable, they can also lead to complacency. It is therefore important that pilots with experience, familiarity and comfort with the aircraft and location, continue to do all checks thoroughly. The ATSB publication, *Avoidable Accidents No. 6 - Experience won't always save you,* is available at www.atsb.gov.au/publications/2012/avoidable-6-ar-2012-035.aspx.

Research conducted by the ATSB found that distractions were a normal part of everyday flying and that pilots generally responded to distractions quickly and efficiently. It also revealed that 13 per cent of accidents and incidents associated with pilot distraction between January 1997 and September 2004 occurred during the approach phase of flight.

The Flight Safety Foundation suggests that, after a distraction source has been recognised and identified, the next priority is to re-establish situation awareness by conducting the following:

- *Identify:* What was I doing?
- *Ask:* Where was I distracted?
- *Decide/act:* What decision or action shall I take to get back on track?

The following provide additional information on pilot distraction:

Dangerous Distraction: An examination of accidents and incidents involving pilot distraction in Australia between 1997 and 2004: www.atsb.gov.au/publications/2005/distraction_report.aspx

Flight Safety Foundation Approach-and-landing Briefing Note 2.4 – Interruptions/Distractions: http://flightsafety.org/files/alar_bn2-4-distractions.pdf

The United States Federal Aviation Administration (FAA) *On Landings Part III pamphlet:*

www.faasafety.gov/files/gslac/library/documents/2011/Aug/56411/FAA%20P-8740-50%20OnLandingsPart%20III%20%5Bhi-res%5D%20branded.pdf

General details

Occurrence details

Date and time:	9 July 2014 – 1716 WST	
Occurrence category:	Accident	
Primary occurrence type:	Wheels up landing	
Location:	Broome Airport, Western Australia	
	Latitude: 17° 56.98' S	Longitude: 122° 13.67' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 210L	
Registration:	VH-SKQ	
Serial number:	21061243	
Type of operation:	Charter	
Persons on board:	Crew – 1	Passengers – 4
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Collision with terrain during a go-around, involving a Cessna 206, VH-TND

What happened

VH-TND accident site

Source: South Australia Police

On 2 August 2014, the pilot arrived at Rawnsley Park aircraft landing area (ALA), South Australia to prepare for the first of three scenic flights scheduled that morning.

After completing the morning runway inspection, the pilot carried out a pre-flight inspection of the Cessna 206 aircraft, registered VH-TND (TND). The pilot had planned the flight, including checking weather information prior to arriving at the airstrip. As there is no terminal area forecast (TAF) service available for Rawnsley Park ALA, the pilot sourced a combination of weather information from area forecasts, synoptic charts, and the local weather at Hawker, an airstrip about 19 NM to the south-west.

After providing a safety briefing to the two passengers, the aircraft departed at about 0845 Central Standard Time (CST). During the departure from runway 03, the pilot reported there was an easterly crosswind of about 8 knots and that the conditions were calm throughout the 30 minute flight around Wilpena Pound.

On the return leg, the pilot elected to conduct a straight in approach onto runway 21. On mid final, with one stage of flap selected, the airspeed was about 80 knots, reducing to about 70 knots with full flap. There was still a crosswind of 8-10 knots from the east; however as the aircraft did not appear to be affected by this wind, the pilot did not compensate with aileron or rudder during the flare and touchdown. The landing was smooth, with the touchdown occurring about 150m past the threshold. The pilot retracted all stages of flap, and then applied light pressure to the brakes.

With about 50 knots of airspeed remaining, the aircraft began to veer to the left (Figure 1). In an attempt to re-align the aircraft with the runway, the pilot applied right rudder, but soon realised he was unable to correct the situation. He applied full power and initiated a go-around.

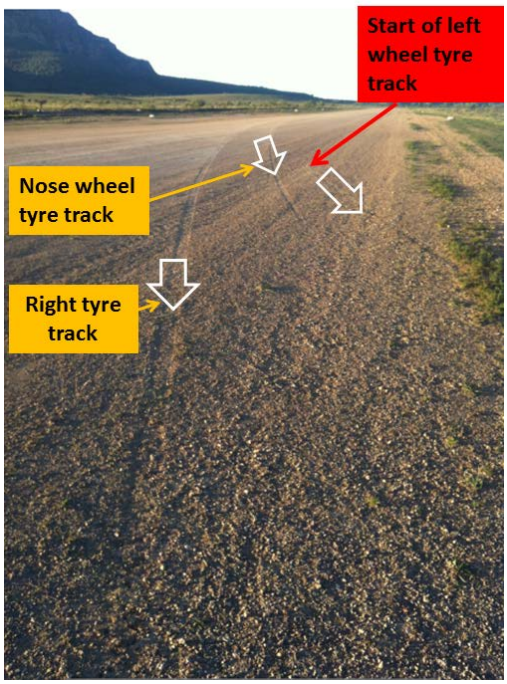
The aircraft continued toward a 45 cm high levee bank running parallel to the runway. The main wheels struck the levee bank, and the aircraft became airborne in a nose high, tail low attitude. In an attempt to clear a shrub (Figure 2), the pilot raised the nose of the aircraft. The aircraft horizontal stabiliser (Figure 3) struck the main trunk of the shrub about 45 cm above the ground, uprooting it.

Conscious of the need to maintain sufficient airspeed to prevent an aerodynamic stall, the pilot lowered the aircraft nose. The aircraft cleared a small tree. The pilot again raised the aircraft's nose in an attempt to clear the windsock.

As TND passed over the windsock, the pilot heard a 'clunk' and the aircraft 'wobbled'. Moments later, the aircraft spun rapidly to the left and collided with the ground (Figure 4). It came to rest about 18 m from the windsock (Figure 5). The pilot shut down the aircraft, and assisted the male passenger from the front left pilot door, then the female passenger from the rear door.

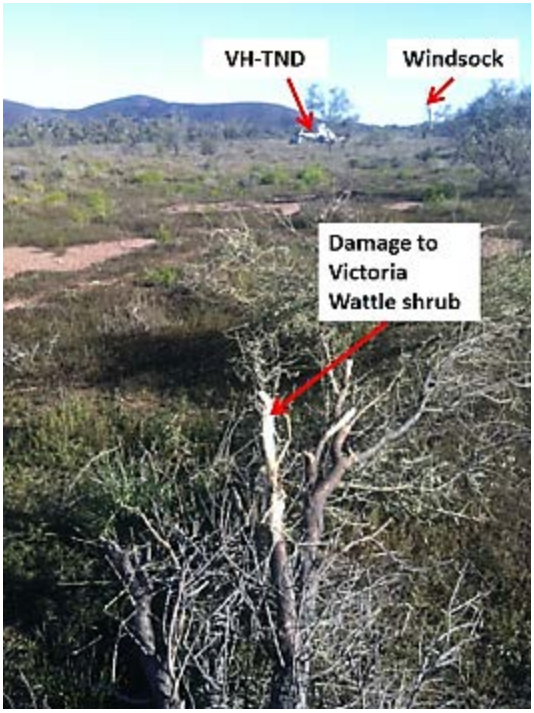
The male passenger sustained serious injuries, and the female passenger minor injuries. The pilot was not injured; however the aircraft was substantially damaged.

Figure 1: VH-TND tyre tracks runway 21



Source: Operator

Figure 2: Shrub, aircraft and windsock



Source: Operator

Figure 3: Damage to horizontal stabiliser

Source: Operator

Figure 4: Rear fuselage and tail damage

Source: South Australia Police

Rawnsley Park, Authorised Landing Area (ALA)

The Rawnsley Park ALA consists of two light gravel runways, 03 and 21, each 1100 m in length. There is a 1°upslope on runway 03. The windsock is on the eastern side, about 300 m from the runway 03 threshold.

Pilot in command experience and recollection of events

The pilot in command had about 316 hours total flying experience. Of this, about 79 hours had been gained on the Cessna 182, and about 42 hours on the Cessna 206 type aircraft.

The pilot had flown a Cessna182 aircraft for a previous seasonal job a few months earlier. He reported that this included coastal flying in strong crosswind conditions.

Figure 5: VH-TND near windsock

Source: South Australia Police

The pilot reported everything with the flight went well up until the aircraft began to veer left. During the go-around, he thought a wheel had struck the windsock. The pilot recalls little else from when the aircraft began to spin, until it came to rest and he was able to shut it down.

Operator report

On 23 July 2014, the operator reported that the Chief Pilot had conducted a 1.9 hour flight check and locality familiarisation flight with the pilot in the aircraft. The check continued the following day, with crosswind circuits at Rawnsley Park ALA, and a short navigation exercise. The crosswind on this day was 15-20 knots from the west. The Chief Pilot reported no concern with the pilot's competency during the check flights.

Safety Message

The following publications are available to assist General Aviation pilots:

The Civil Aviation Safety Authority (CASA) has available on their website a booklet and DVD looking at situational awareness. Chapter 6 specifically looks at Losing Situational Awareness.

This is available through CASA's online store: www.casa.gov.au

The European General Aviation Safety Team (EASA) published a Safety Promotion Leaflet on Decision Making for General Aviation Pilots.

This brochure is available at www.easa.europa.eu/essi/egast/2011/04/decision-making/

General details

Occurrence details

Date and time:	2 August 2014 – 0900 CST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Rawnsley Park ALA, South Australia	
	Latitude: 31° 39.00’ S	Longitude: 138° 37.00’ E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 206H	
Registration:	VH-TND	
Serial number:	20608318	
Type of operation:	Charter – passenger	
Persons on board:	Crew – 1	Passengers –2
Injuries:	Crew – Nil	Passengers –1 serious, 1 minor
Damage:	Substantial	

Collision with terrain involving a Mooney M20J, VH-JDY

What happened

On 5 September 2014, at about 0815 Western Standard Time, the pilot of a Mooney M20J aircraft, registered VH-JDY, taxied for a solo training flight from Jandakot Airport to Northam aeroplane landing area (ALA), Western Australia. After conducting navigation and aerial work training exercises and at about 2,500 ft above mean sea level, the pilot commenced an approach to Northam. After selecting the common traffic advisory frequency (CTAF), the pilot of JDY heard the pilot of another aircraft broadcast at Northam joining on midfield crosswind for runway 14. The pilot of JDY then elected to also overfly the airfield and join midfield for a touch-and-go[1] on runway 14. When on final approach, the pilot observed the aerodrome windsock indicating a light crosswind.

After an uneventful touch-and-go, the pilot conducted a second circuit with a missed approach from about 600 ft on final. The pilot then intended to conduct a third circuit with a touch-and-go. When on final approach, the pilot trimmed[2] the aircraft in the approach configuration with full flaps (33°) and an airspeed of about 70 knots.

The pilot reported that, after flaring the aircraft for landing, it flew parallel to the ground for some distance and touched down about one third of the way along the runway. As the aircraft slowed, the pilot selected the flaps to 15° and applied full throttle along with right rudder to counteract the aircraft's tendency to yaw left. As the airspeed increased to about 65 knots, the pilot rotated the aircraft for take-off and applied forward pressure against the control column as the aircraft nose tendency was to pitch up due to the combination of trim, flap and power settings.

The pilot reported initially adopting a normal climb attitude after take-off. When at about 50 ft above ground level, the pilot observed that the aircraft had drifted to the right of the runway centreline and attempted to correct the drift by slightly reducing the right rudder input. The aircraft wings remained level, however shortly after the pilot corrected the direction of the aircraft, the nose pitched up. The stall warning sounded and the pilot applied full right rudder and pushed forward on the control column in an attempt to level the wings and recover from the stall.[3] The left wing dropped as the aircraft stalled, and it descended and collided with a hangar. The aircraft pivoted about the left wing and came to rest wedged between two hangars resulting in substantial damage (Figures 1 and 2).

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1 A touch-and-go is a practice landing where the aircraft is permitted to briefly touch down prior to lifting off.

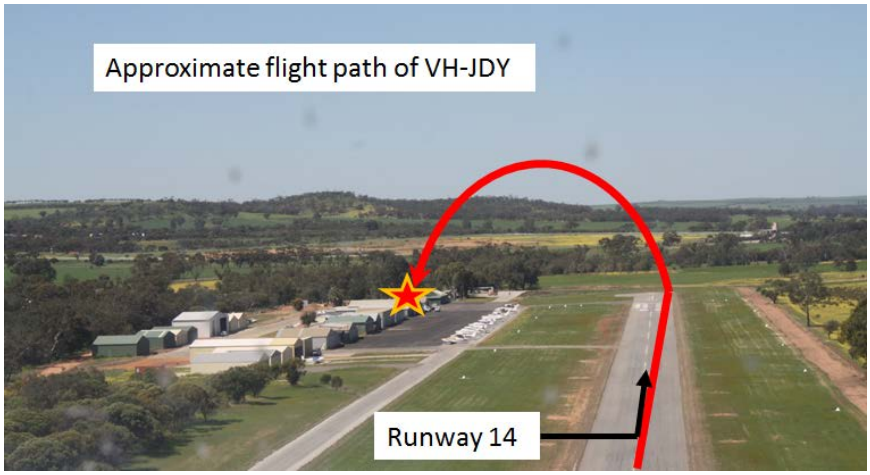
2 An aircraft is considered to be 'trimmed' in pitch when the pitching moment is zero. When 'in trim' the pilot is not required to exert force on the elevator control to maintain the aircraft's attitude.

3 An aerodynamic stall occurs when a wing is no longer producing enough lift to support an aircraft's weight.

Figure 1: Accident site and damage to VH-JDY

Source: Operator

Figure 2: Northam (ALA) and approximate flight path



Source: Operator

General details

Occurrence details

Date and time:	5 September 2014 – 1040 WST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Northam (ALA), Western Australia	
	Latitude: 31° 37.55' S	Longitude: 116° 41.07' E

Aircraft details

Manufacturer and model:	Mooney Aircraft Corporation M20J	
Registration:	VH-JDY	
Serial number:	24-1681	
Type of operation:	Flying Training – Solo	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Minor)	Passengers – Nil
Damage:	Substantial	

Helicopters

Collision with terrain involving a Bell 206, VH-FHX

What happened

On 14 September 2014, the pilot of a Bell 206 helicopter, registered VH-FHX, conducted a charter flight from Myra mine camp, Northern Territory with 3 passengers on board. The pilot was tasked to fly to a number of locations identified by latitude and longitude, and land as close as possible to each location.

After arriving overhead the eighth location for that day, the pilot conducted an orbit at about 500 ft above ground level (AGL) to assess the area for a suitable landing site. After identifying a site, the pilot then conducted a second orbit at about 100 ft AGL. During this orbit, the pilot noted the hazards including a tree stump to the left of the target landing area and a tall tree to the right.

At about 1218 Central Standard Time, the pilot conducted an approach and, when at about tree-top height, completed a final appraisal of the site and elected to continue the approach to land. The pilot then conducted a vertical descent into the selected landing site. When at about 1 ft AGL, the passenger seated in the left front seat alerted the pilot to the tree stump on the left, observing that he thought it may be tall enough to strike the main rotor. Due to the sense of urgency in the passenger's voice, the pilot immediately manoeuvred the helicopter up and to the right. During this manoeuvre, the pilot heard the helicopter strike a tall tree (Figure 1).

Figure 1: Tree damage following helicopter strike

Source: Operator

The pilot conducted a climb away from the site, an orbit and a second approach to land. After landing, the pilot shut down the helicopter and the passengers disembarked. The pilot then conducted an external inspection of the helicopter and assessed the damage to the main and tail rotor blades to be minor and unlikely to affect the safety of the flight. No alerts or caution lights illuminated and the pilot did not detect any vibrations following the tree strike.

After completing the charter flight and returning the passengers to Myra, the pilot again inspected the helicopter. The damage had not increased during the flight and the pilot elected to conduct a solo ferry flight to return to the helicopter base in Jabiru.

About 20 minutes later, after landing at Jabiru, the pilot inspected the helicopter and found the damage to the main rotor blade had worsened significantly (Figure 2). The pilot then assessed the

helicopter as unserviceable and contacted the senior base engineer. The engineer subsequently determined that the main rotor blade and tail rotor blade had sustained substantial damage and required replacement.

Figure 2: Damage to main rotor blade tip

Source: Operator

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Helicopter operator

As a result of this occurrence, the helicopter operator has advised the ATSB that they have taken the following safety actions:

- Updated the company induction procedures to include post incident actions.
- Reissued a flight safety instruction with the following requirements:

  An incident must be assessed for its potential to have caused an accident. If an accident nearly occurred due to an aircraft anomaly, the aircraft is to be deemed unserviceable until advised by the chief pilot or engineering manager.

  Any warning generated by the helicopter warning system or abnormal flight characteristics is to be discussed with the senior base engineer or engineering manager prior to continuing or commencing flight.

- Purchased satellite telephones for company pilots operating in remote areas.
- Issued a flight safety instruction directing company pilots to brief passengers seated in the co-pilot seat that: they are not to touch any instruments other than headphones; they are not to act erratically, loudly or irresponsibly; and when taking off or landing between ground and 500 ft, the cockpit should remain sterile and conversation other than immediately related to flight is forbidden.

Safety message

This incident highlights the challenges of operating in confined areas and the risks posed by distractions. It is also a reminder to ensure an aircraft is fully serviceable prior to flight, particularly following an incident.

General details

Occurrence details

Date and time:	14 September 2014 – 1218 CST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	94 km ESE of Jabiru aerodrome, Northern Territory	
	Latitude: 12° 25.37' S	Longitude: 133° 43.45' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 206B	
Registration:	VH-FHX	
Serial number:	2822	
Type of operation:	Charter	
Persons on board:	Crew – 1	Passengers – 3
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this Bulletin

The ATSB receives around 15,000 notifications of Aviation occurrences each year, 8,000 of which are accidents, serious incidents and incidents. It also receives a lesser number of similar occurrences in the Rail and Marine transport sectors. It is from the information provided in these notifications that the ATSB makes a decision on whether or not to investigate. While some further information is sought in some cases to assist in making those decisions, resource constraints dictate that a significant amount of professional judgement is needed to be exercised.

There are times when more detailed information about the circumstances of the occurrence allows the ATSB to make a more informed decision both about whether to investigate at all and, if so, what necessary resources are required (investigation level). In addition, further publically available information on accidents and serious incidents increases safety awareness in the industry and enables improved research activities and analysis of safety trends, leading to more targeted safety education.

The Short Investigation Team gathers additional factual information on aviation accidents and serious incidents (with the exception of 'high risk operations), and similar Rail and Marine occurrences, where the initial decision has been not to commence a 'full' (level 1 to 4) investigation.

The primary objective of the team is to undertake limited-scope, fact gathering investigations, which result in a short summary report. The summary report is a compilation of the information the ATSB has gathered, sourced from individuals or organisations involved in the occurrences, on the circumstances surrounding the occurrence and what safety action may have been taken or identified as a result of the occurrence.

These reports are released publically. In the aviation transport context, the reports are released periodically in a Bulletin format.

Conducting these Short investigations has a number of benefits:

- Publication of the circumstances surrounding a larger number of occurrences enables greater industry awareness of potential safety issues and possible safety action.
- The additional information gathered results in a richer source of information for research and statistical analysis purposes that can be used both by ATSB research staff as well as other stakeholders, including the portfolio agencies and research institutions.
- Reviewing the additional information serves as a screening process to allow decisions to be made about whether a full investigation is warranted. This addresses the issue of 'not knowing what we don't know' and ensures that the ATSB does not miss opportunities to identify safety issues and facilitate safety action.
- In cases where the initial decision was to conduct a full investigation, but which, after the preliminary evidence collection and review phase, later suggested that further resources are not warranted, the investigation may be finalised with a short factual report.
- It assists Australia to more fully comply with its obligations under ICAO Annex 13 to investigate all aviation accidents and serious incidents.
- Publicises ***Safety Messages*** aimed at improving awareness of issues and good safety practices to both the transport industries and the travelling public.

Australian Transport Safety Bureau

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Investigation

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